

## Real Time Bus Monitoring and Students Information System

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**Abstract**—This paper proposes a real time college bus tracking and a student information system which runs on an android smart phone. The main purpose of this application is to provide exact location of a student's respective bus in the Google maps. This application is very useful for parents. GPS tracking device receives signals from the GPS satellites. Depending on the time which the signal takes to reach the device from each satellite, the GPS receiver can calculate its exact location on the ground. The GPS tracking device can then route that information back to an online tracking system for mapping. We have also proposed a student information system for parents to view student's details on android smart phone that keeps them updated about the latest events in the college or school. Parents can locate the bus in the route map. Using this application, parents can also get their ward's mark details, attendance, performance rate, and can communicate with the teachers through chat.

**Keywords**—Global Positioning System(GPS), Google Map, Android Application

### I. INTRODUCTION

Today android applications are very good source for tracking the vehicles. It provides real time data on the movement of vehicles. Android is becoming very popular in market for two mainstream reasons first, source code is completely free and second, android is highly suitable for expansion as the developer see fit.

The students use the school bus to travel to the school and back. The problem that arises here is that the parents may not know the exact location of the school bus. The proposed system is a standalone system designed to display the real-time location(s) of the school bus. School bus routing and scheduling are among the major problems because school bus transportation needs to be safe, reliable and efficient. This project also aims to investigate how a school transportation management system may improve the transportation security. The result from this study has helped to develop a school bus routing and scheduling application.

This system will make use of GSM and GPS modules to give exact and real time location of bus and for that we are using a microcontroller along with GSM and GPS module. The GSM module will be provided with a SIM card for communication purpose. GPS will give the longitude and latitude values and that value are transmitted to the server with the help of

Global Service for Mobile (GSM module). Once the longitude and latitude values are uploaded on the server, the user with the help of android application will be able to download it from server and get the real time location of the college bus, which he can see it through the Google maps integrated in it.

This application will also send message notification/Alert five minutes before the school bus arrives in the morning to pick the students. When an accident occurs, a message notification will be sent to the school and guardians of the students about the accident and the spot in which it occurred.

But in all tracking systems internet and external data servers are used as a basic requirement. This involves investing a large amount of money into the system. So the system developed in this paper is mainly aimed at reducing costs in tracking systems and it is to be implemented in college or school buses which take a specific route on a daily basis.

We also proposed a student information system for parents to view student details on mobile and keeping them updated about latest events in college. Parents can locate bus in route map thereby they get the exact location of their student. The developed android application will be used by parents, staffs and the administrator who maintains the system. The staff can add students personal and academic details, post their

queries regarding a particular subject on the respective discussion forum. In this application, parents can communicate with staff by chat and viewing notices broadcasted by the staff/admin. The administrator has the authority of modifying the student details, adding or deleting teachers as and when they get admitted to the college or leave the college. Thus, this application will automate the manual student information maintenance process in schools. It will also reduce the amount of paperwork done and time invested in manual process by the teachers [1-4].

Rest of the paper is organized as follows, Section I contains the detailed description of the proposed real time bus monitoring and student information system, Section II contain the related works of this paper, Section III contain the methodology used in the proposed system, Section IV describes results and discussion and Section V concludes research work with future directions.

## II. RELATED WORK

In [3], a vehicle tracking system is an electronic device, installed in a vehicle to enable the owner or a third party to track the vehicle's exact place. This paper proposed to design a vehicle tracking system that works using GPS and GSM technology. This design will continuously monitor a moving college bus and report the status of the bus on demand.

In [1], the paper proposes tracking of the college buses of St. Peter's College of Engineering and Technology in Chennai that would give the exact location of buses with the help of Google map. This application may be greatly used by college students and staffs since Android mobiles has become common and spread everywhere. The proposed system is useful for parents also.

Here the project was developed to aid locating the children position. The proposed system produces bus arrival message, details about students, details about staff, driver, emergency alerts and many others.

## III. METHODOLOGY

The proposed methodology consists of three major modules such as Admin, GPS, Staff and Parent. The proposed system allows the user to find exact location of the bus. The position of the bus is displayed in the Google map. Depending on the information like distance and position displayed on Google map, user can plan and start accordingly. Modules are as follows:

- Admin
- GPS
- Staff

- Parent

### 1] Admin

Admin can login to their account after authentication. Admin can add or remove student, parent, events or notices, schedule routes and add bus stops.

### 2] GPS

It tracks the vehicle through GPS and transmits its current location to the server. The Global Positioning System (GPS) is a satellite radio navigation system developed by the Department of Defence owned by the United States Government. The system makes use of a medium earth orbit satellite constellation transmitting microwave signals allowing a GPS receiver to determine its position, velocity and time.

### 3] Staff

Staffs should enter their user name and password to login into application. The staff can chat with their ward's parent about the latter's performance. They can also add the ward's marks and can upload notes.

### 4] Parent

The main function of parent module is to provide login interface to user and to show the Google map with vehicle locations. They can also view their child details, marks and profile, notices and download notes. They can also chat with their child's class teacher to discuss about their performance. They can also rate the staffs.

The system is composed of client and server interface. At client side we have an android application which runs on device which is provided with the parent. At server side we have website to store all details related to services like student details, staff details, parent details, bus details, and bus stop details. Parent can track the current location of bus on Google map fetch from server. Admin maintains all information on the server.

## IV. RESULTS AND DISCUSSION

### A. Admin Module (J2EE)

1. Login
2. Can add and manage details of students (include photo and blood group)
3. Can add and manage details of staff
4. Can add and manage details of Parents
5. Can add and manage details of driver
6. Allocate bus route- admin can add the bus schedule, route etc
7. Track bus
8. Logout

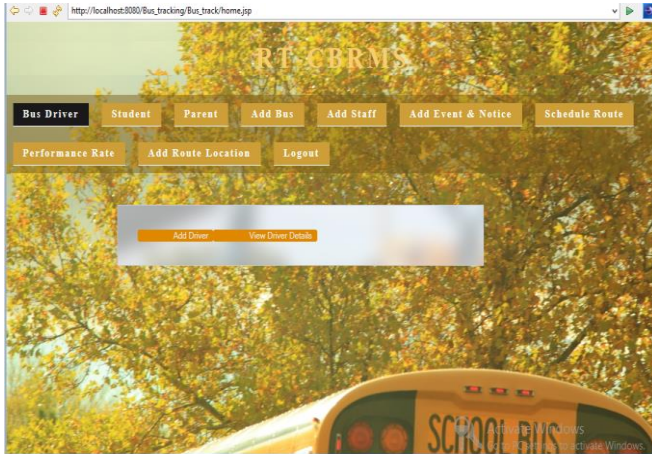


Figure 1. Home Page (Admin Module)

### B. Staff Module (J2EE)

1. Login
2. Add marks
3. Staffs can communicate with parent by chat.
4. View Performance rate- staffs can view their performance rate
5. Logout

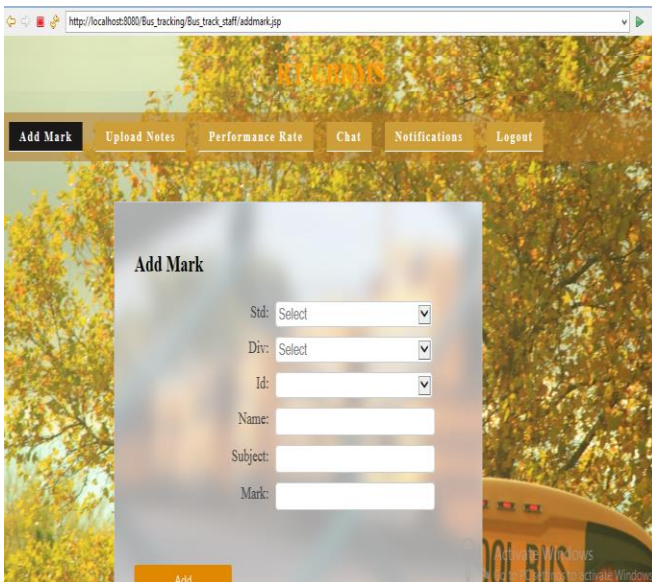


Figure 2. Home Page (Staff Module)

### C. Parent Module (Android)

1. Login - if a registered user for using this application
2. Get details- parents can get the details about the bus route
3. Locate bus in route map
4. Add complaints- parents can submit their complaints or suggestions to the complaint box

5. View driver details of specified bus
6. View profile- parents can view their profile
7. View and download student academic details and notes
8. Give staff ratings
9. Logout- to logout from app

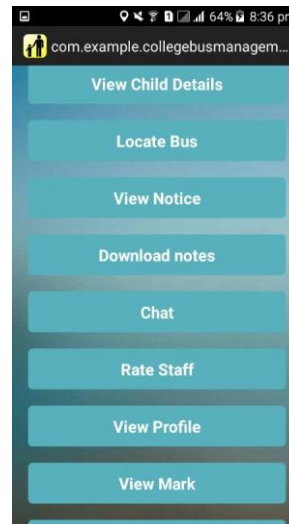


Figure 3. Home Page (Parent Module)

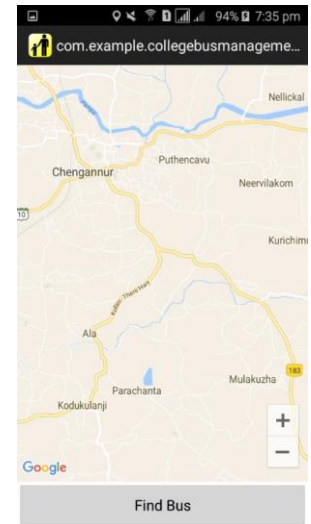


Figure 4. Google Map (Locate Bus)

### D. GPS MODULE

It would be time consuming to track location on printed maps. But now a day's various websites are available on internet which shows online map. Google map is one of the main and useful website. We use any one of these websites to track or find the location of vehicle. We can track the location using longitude and latitude received in SMS. Using these maps you can get the exact location as well as directions to go to those places from your current/desired location.

### V. CONCLUSION

"Real time bus tracking and student monitoring system" tracks the location of the bus using GPS and displays it on Google map and monitors the students. By fixing GPS in every bus, we can track each bus from their current location. Parents can also know about their ward's performance in class. The solution proposed in this paper takes advantage of the salient features offered in smart phones. The architecture of this system is built on two main component, GPS satellite, and database services. Developing this project would not have been possible without studying the related and existing works. This work relies on internet connectivity or a server that has to be up running. The proposed system relies on location services and android.

Finally, like any software product or design, there is still room for future enhancement. Features can be added to enhance the system such as Geo-fencing and many others. As a future enhancement we would like to give a barcode to each student on their ID card. On entering and leaving the bus, the student should bring their ID card in front of a barcode reader installed in the bus. Those details will be immediately sent to database server and thus parents can be aware of the fact that their ward is present in the bus or not.

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